SANGEAN

EUROPE

Service Manual

CR 220D FM

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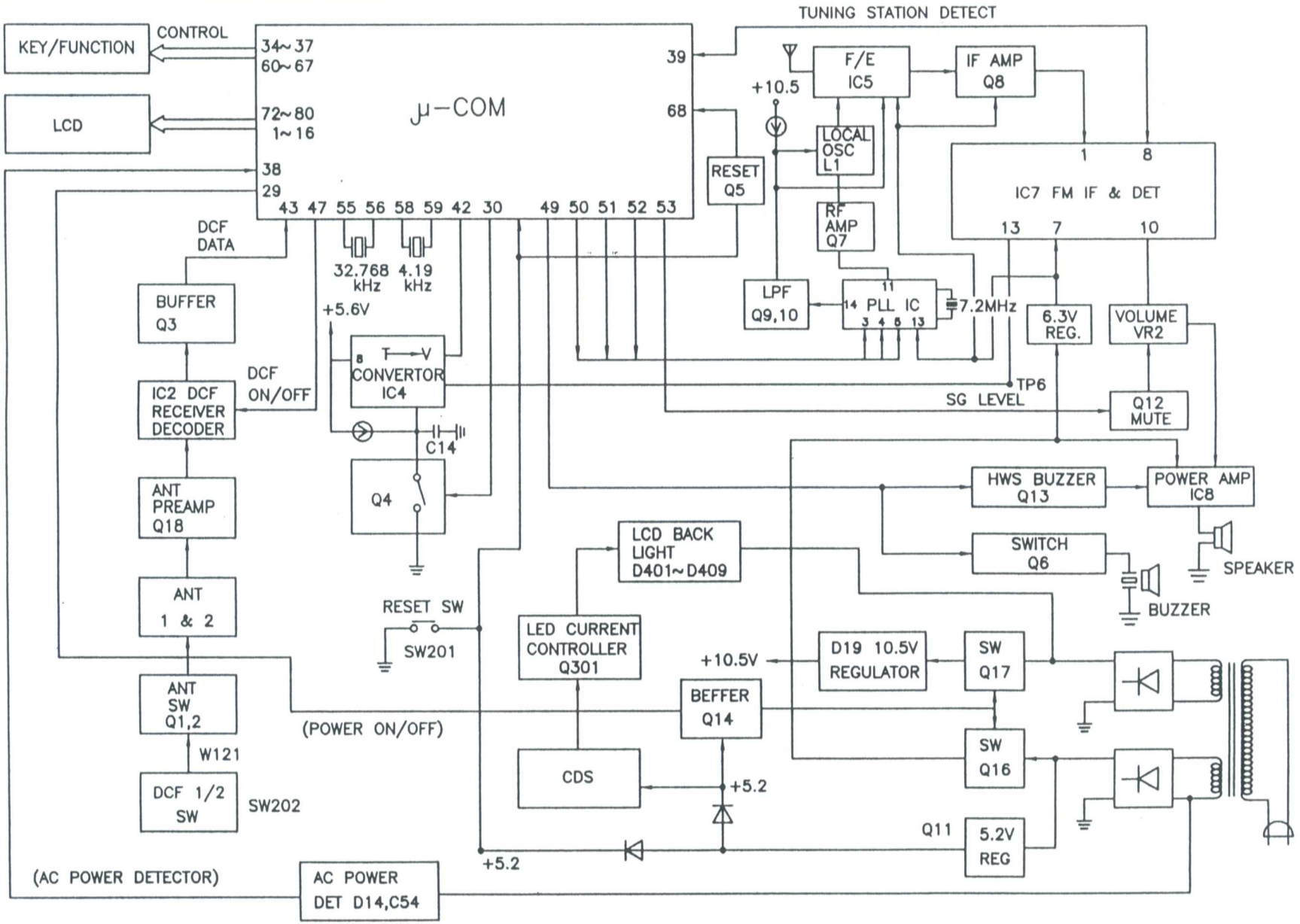
SPECIFICATIONS

FM

TEST ITEM	CONDITION	NOMINAL	LIMIT	UNIT
Tuning Range	Min	87	± 0.5	MHz
	Max.	108.50	± 0.5	
Intermediate freq.		10.70	± 0.1	MHz
Max. Sensitivity	90MHz	12	18	dBμ emf
	98MHz			
	106MHz			
Usable Sensitivity	90MHz	18	24	dBμ emf
	98MHz			
	106MHz			
Image Rejection	106MHz	26	20	dB
I.F. Rejection	90MHz	60	50	dB
3dB Limiting	98MHz	16	22	dBμ emf
Min. Output		1.5	3	mV
Tuning Ind. Sens.				dBμ
Auto. Scan. Stop. Sens		18	24	dBμ emf
S/N Ratio		50	40	dB
Current Consumption				mA
AM. Suppression			30	dB
Freq. Response (-6dB)			150	Hz
			6K3	Hz
Output Power (75kHz,dev)				mW
		500	400	
T.H.D. (75kHz,dev)		2	4	%
Over Load Capacity			106	dBμ emf
Calibration	90MHz		± 50	kHz
	98MHz			
	106MHz			
Lowest Operating Volt.	98MHz		207	Vac

Supply Voltage: AC230V	R.O. : 50 mW	Load: 8 ohm	Modulation : 1kHz/22.5kHz Dev.

RG-418 BLOCK DIAGRAM



BLOCK DIAGRAM

ALIGNMENT INSTRUCTIONS

(1) ALIGNMENT FOR CLOCK TIME ACCURACY

a. Required Instrument
Clock Counter and 32.768kHz Sensor

b. Alignment Procedure

Mode	Adjustment	Procedure
RADIO OFF	VT1	(1) Set radio to OFF. (2) Let 32.768kHz sensor.Close to the PCB. Show on figure 1-1. (3) Adjust VC202 to within ± 20sec/month.

c. Instrument Connection

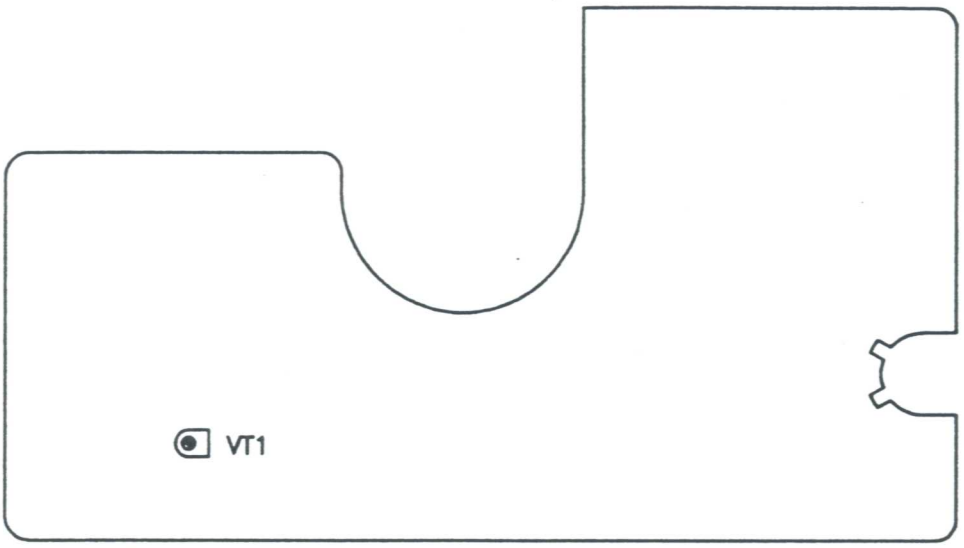
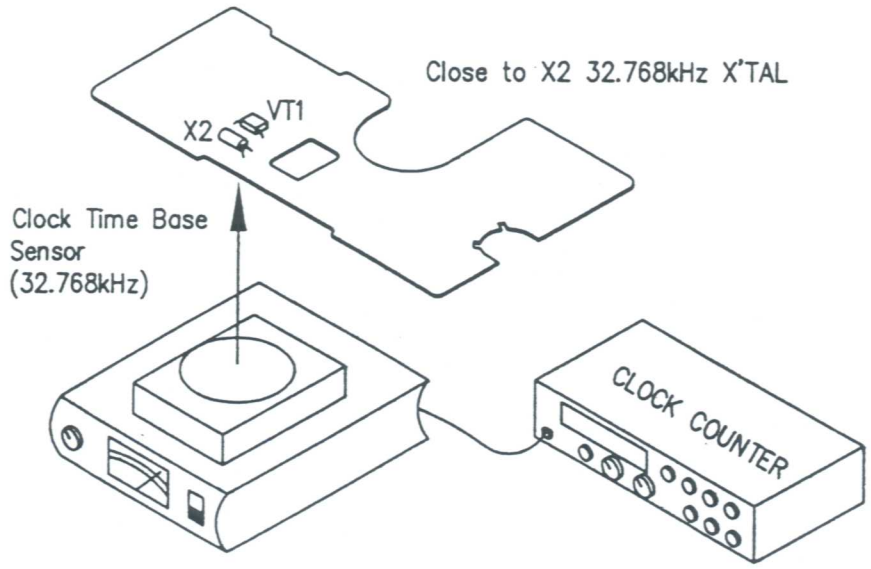


Figure 1-1



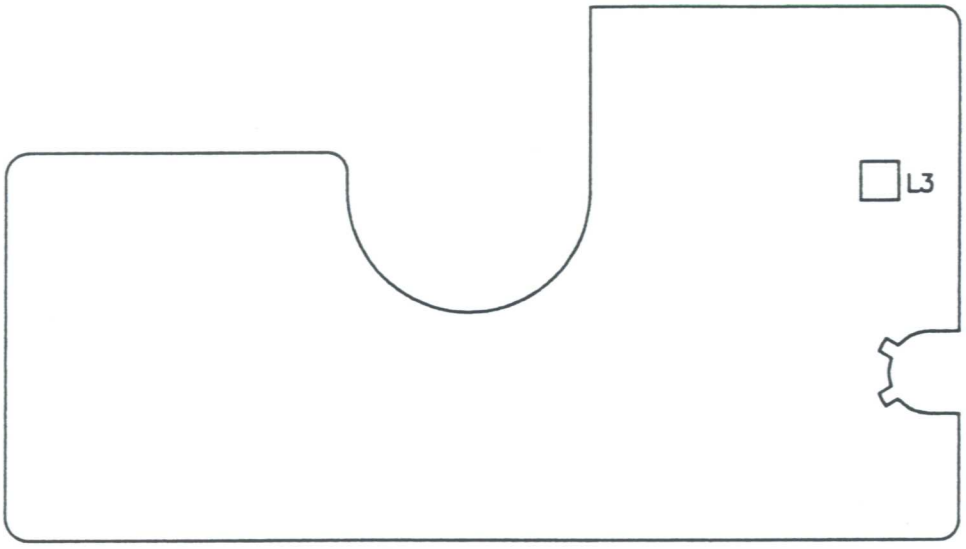
(2) ALIGNMENT FOR FM BAND PLL TUNING VOLTAGE (VT)

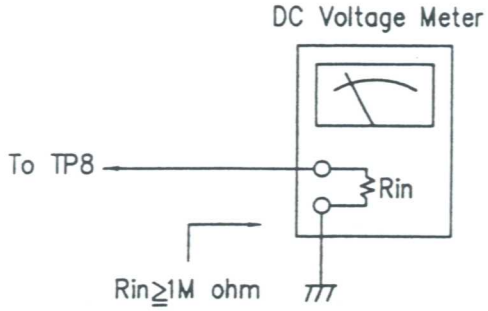
a. Required Instruments
RF Counter
DVM (Digital Voltmeter)

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	L3	(1) Turn the radio ON and set frequency of receiver. (2) Set receiver frequency to 108MHz. (3) Connect a voltage meter to VT point (TP8). (4) Adjust L3 unitl the VT within 8.5 ± 0.5V.

c. Instrument Connection





(3) ALIGNMENT FOR FM STATION DETECT

a. Required Instruments

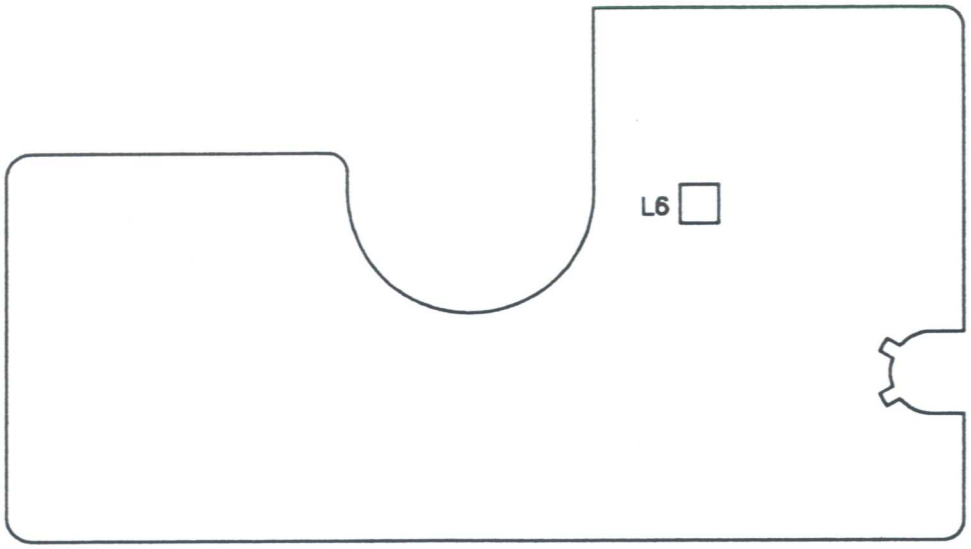
FM RF Signal Generator (RFSG)

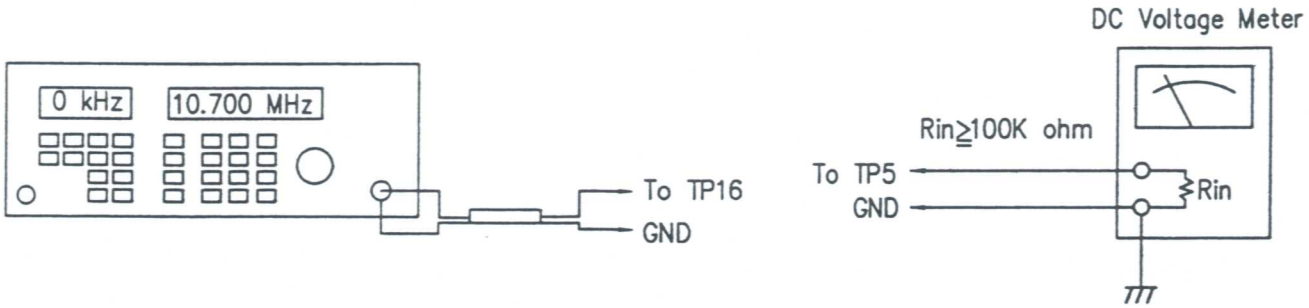
DC Voltage Meter (DVM)

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	L6	(1) Turn the radio ON. (2) Connect a RFSG to TP16 and set input level to 60dB μ without modulation. (3) Connect a DVM to TP5. (4) Set RFSG frequency to 10.7MHz $\pm$ 30kHz that. Read DVM at the low LEVEL (about 0.2V)

c. Instrument Connection





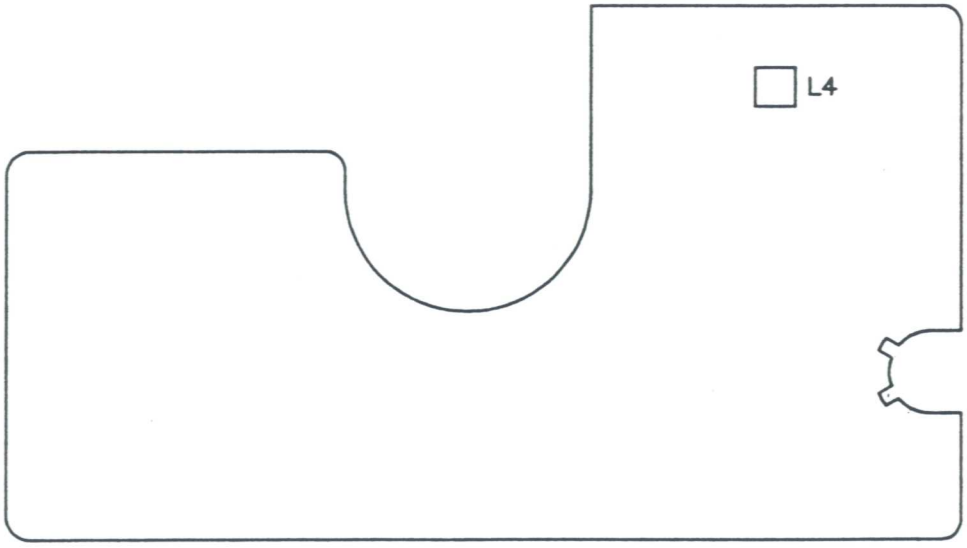
(4) ALIGNMENT FOR FM IFT 10.7MHz

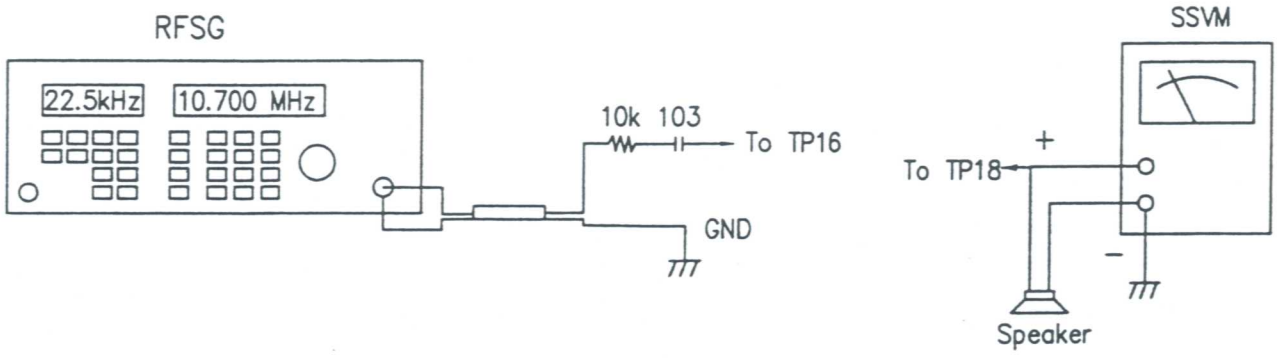
a. Required Instruments
FM RF Signal Generator (RFSG)
SSVM

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	L4	(1) Turn the radio ON. (2) Connect FM RFSG output to TP16. (3) Set the RFSG frequency is 10.7MHz and dev. at 22.5kHz. (4) Connect a SSVM to power AMP O/P(TP18) (5) Change RF output level of RFSG. Make FM receiving at max. sensitivity. (6) Adjust L4 reading SSVM to max.

c. Instrument Connection





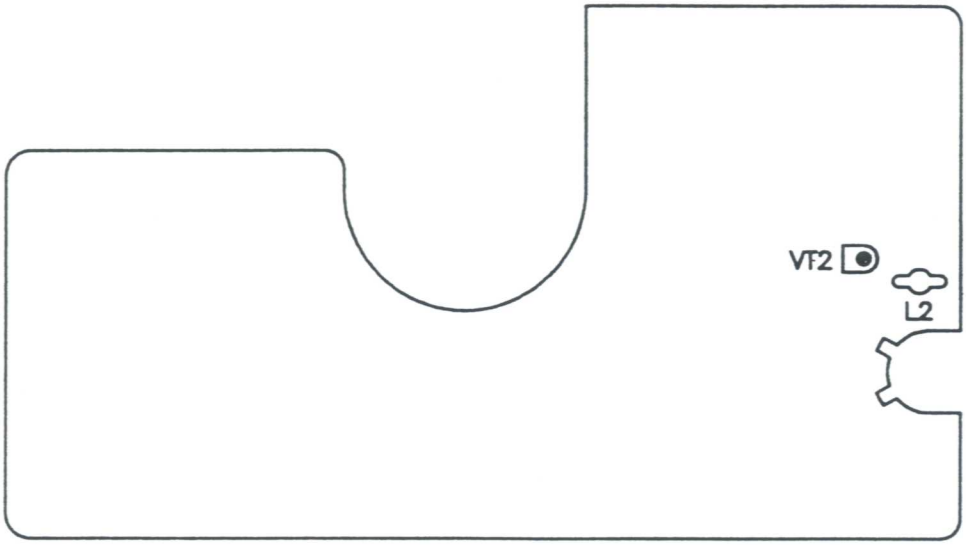
(5) ALIGNMENT FOR FM SENSITIVITY

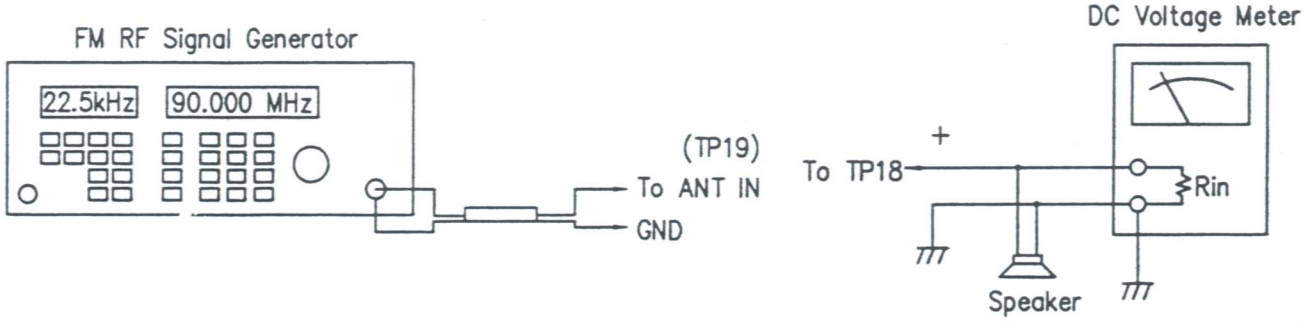
a. Required Instruments
FM Signal Generator
SSVM

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	VT2 L2	(1) Turn the radio NO. (2) Connect a SSVM to TP18 of power AMP output point. (3) Connect a FM signal generator to the input terminal of Ant.(TP19) (4) Set the Siganl generator to 22.5kHz deviation with 1kHz modulation. (5) Tune the FM band frequency to 90MHz and adjust L2 to have a max. reading on SSVM. (6) Return the FM band frequency to 106MHz and adjust VT2 to have a max. reading on SSVM. (7) Repeat (5) and (6) until a best sensitivity on these two frequencies are fromed.

c. Instrument Connection





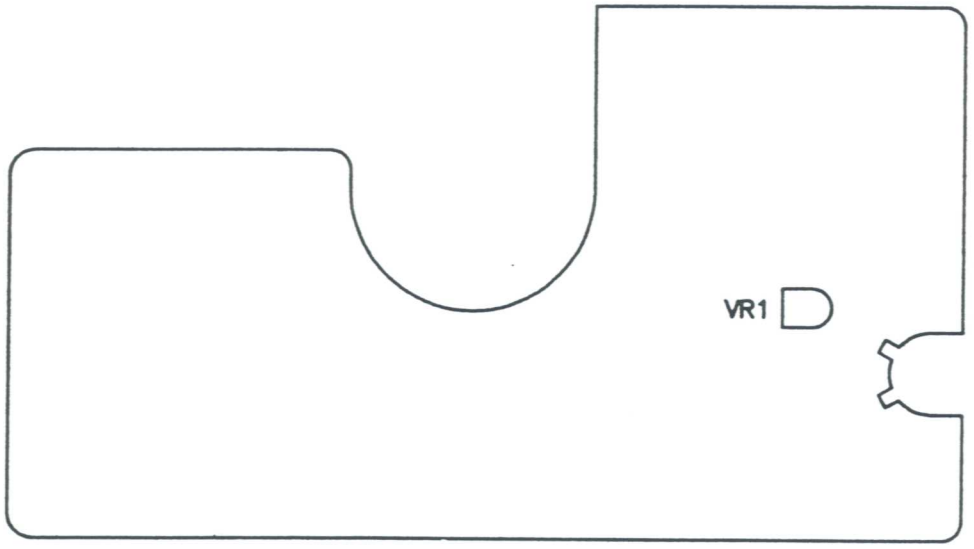
(6) ALIGNMENT FOR STATION DETECT SENSITIVITY

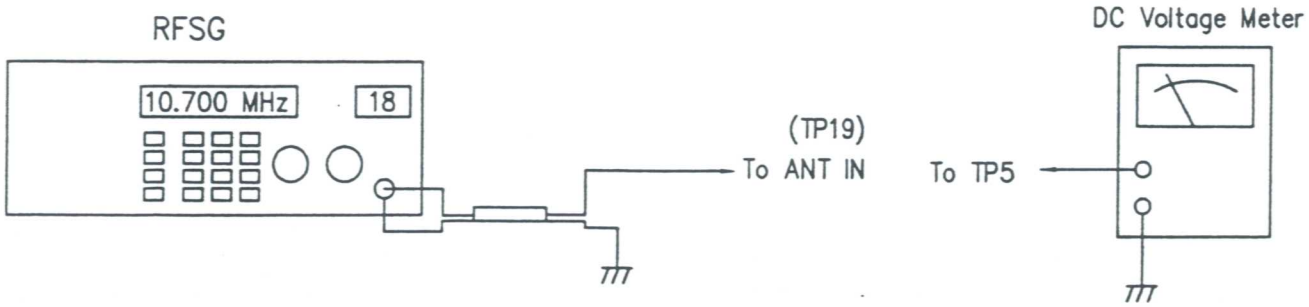
a. Required Instruments
RF Signal Generator
DC Voltage Meter

b. Alignment Procedure

Mode	Adjustment	Procedure
FM 98MHz	VR1	(1) Radio is turn ON and receiver frequency at 98MHz. (2) Set RFSG frequency to 98MHz and output level to 18dBμ without modulation. (3) RFSG connect to ANT IN (TP19). (4) Connect DVM to TP5. (5) Adjust VR1 let DVM read to " LOW " level when input level is more than 18dBμ.

c. Instrument Connection





Attention : If adjust VR1 can't let TP5 become to "low" then you must readjust FM sensitivity and IFT, station detect.

(7) ALIGNMENT FOR DCF ANTENA

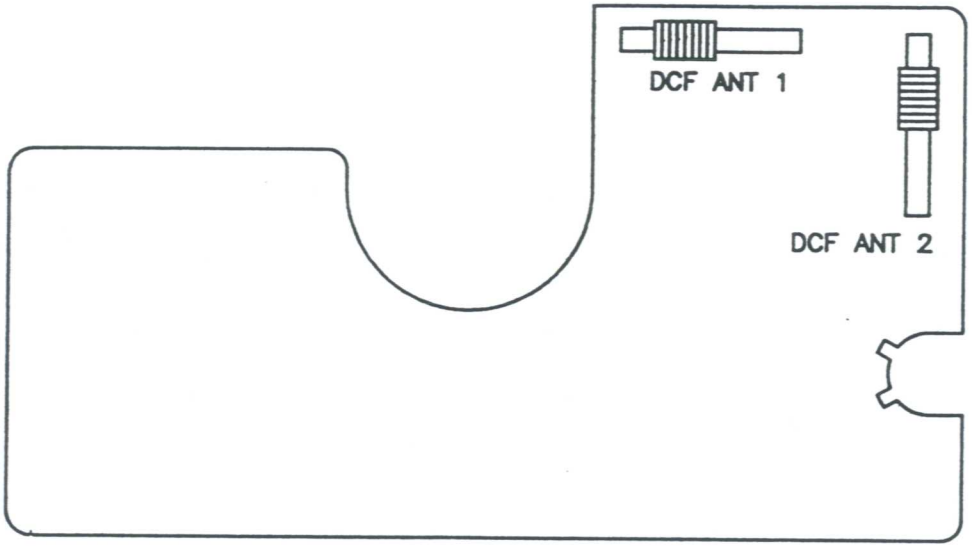
a. Required Instruments

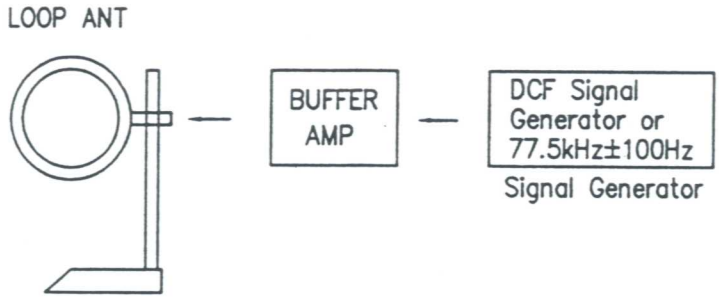
DCF Signal Generator and Buffer AMP.
Loop ANT.
SSVM

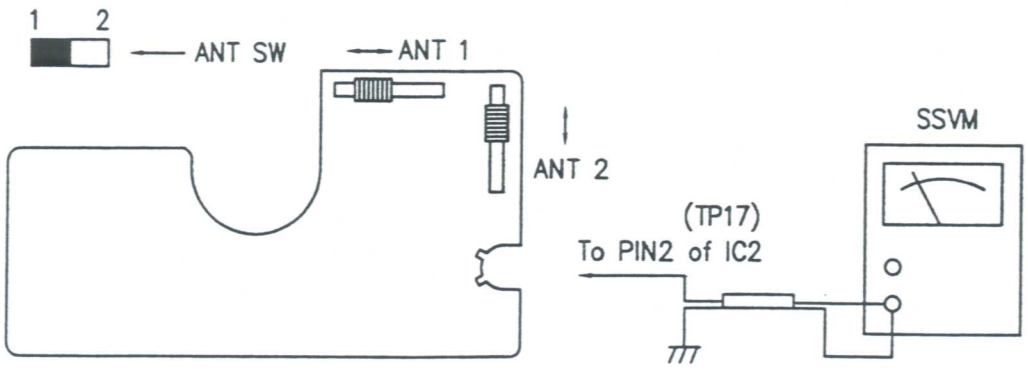
b. Alignment Procedure

Mode	Adjustment	Procedure
RADIO OFF	ANT 1 and ANT 2	(1) Loop ANT close to ANT 1 or 2. (2) AC power must be from off to ON. (3) Connect SSVM to TP17. (4) Moving the ANT coil 1 and 2. According to DCF SW select 1 or 2. (5) Let SSVM reading 77.5kHz level to max.

c. Instrument Connection







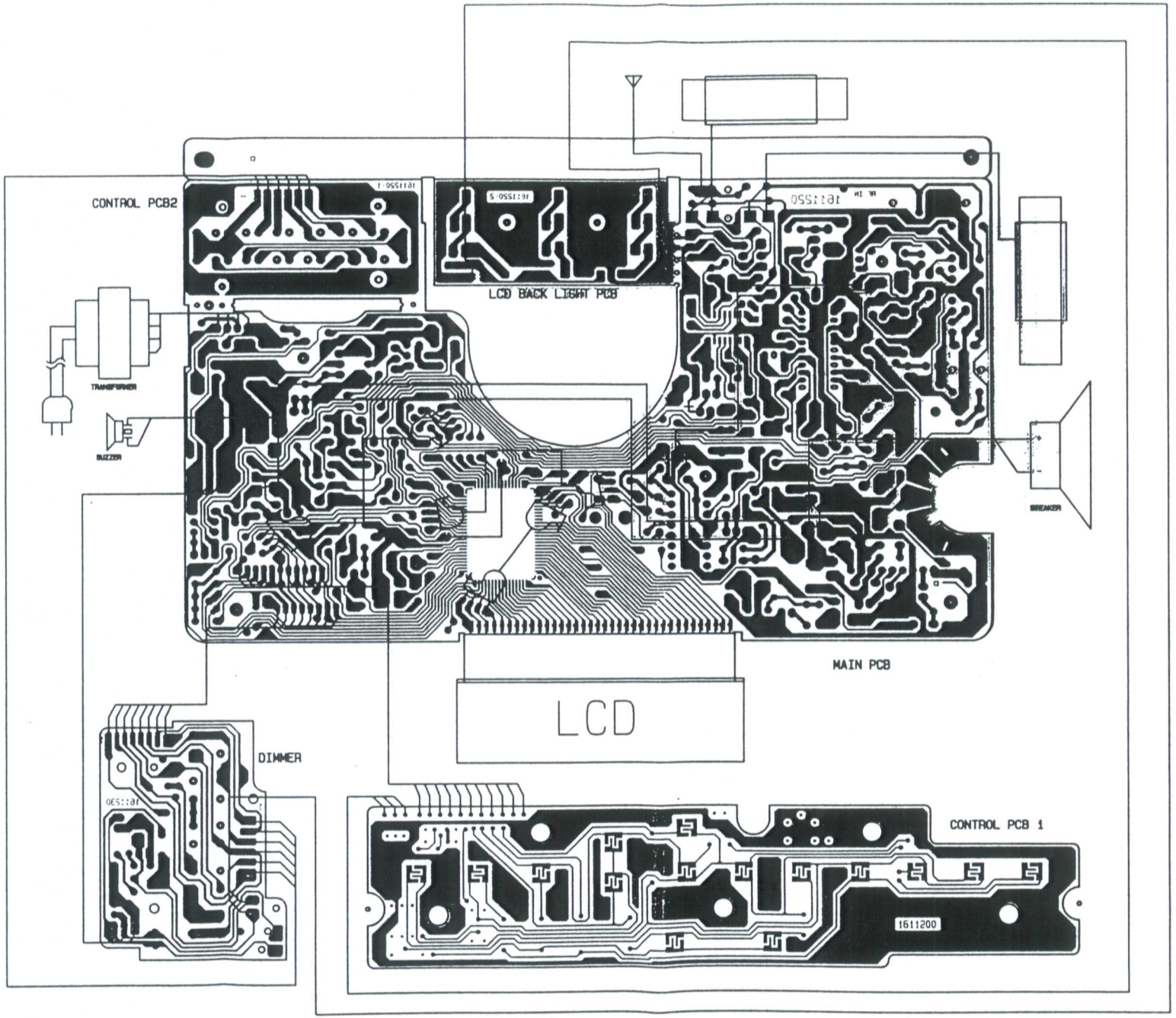
Attention : 1. Loop ANT must → DCF ANT.
2. Select ANT1 or 2 by short pin 1 and pin 2 or pine 2 and pin 3 of connecter W121.

TESTER POINT DIAGRAM

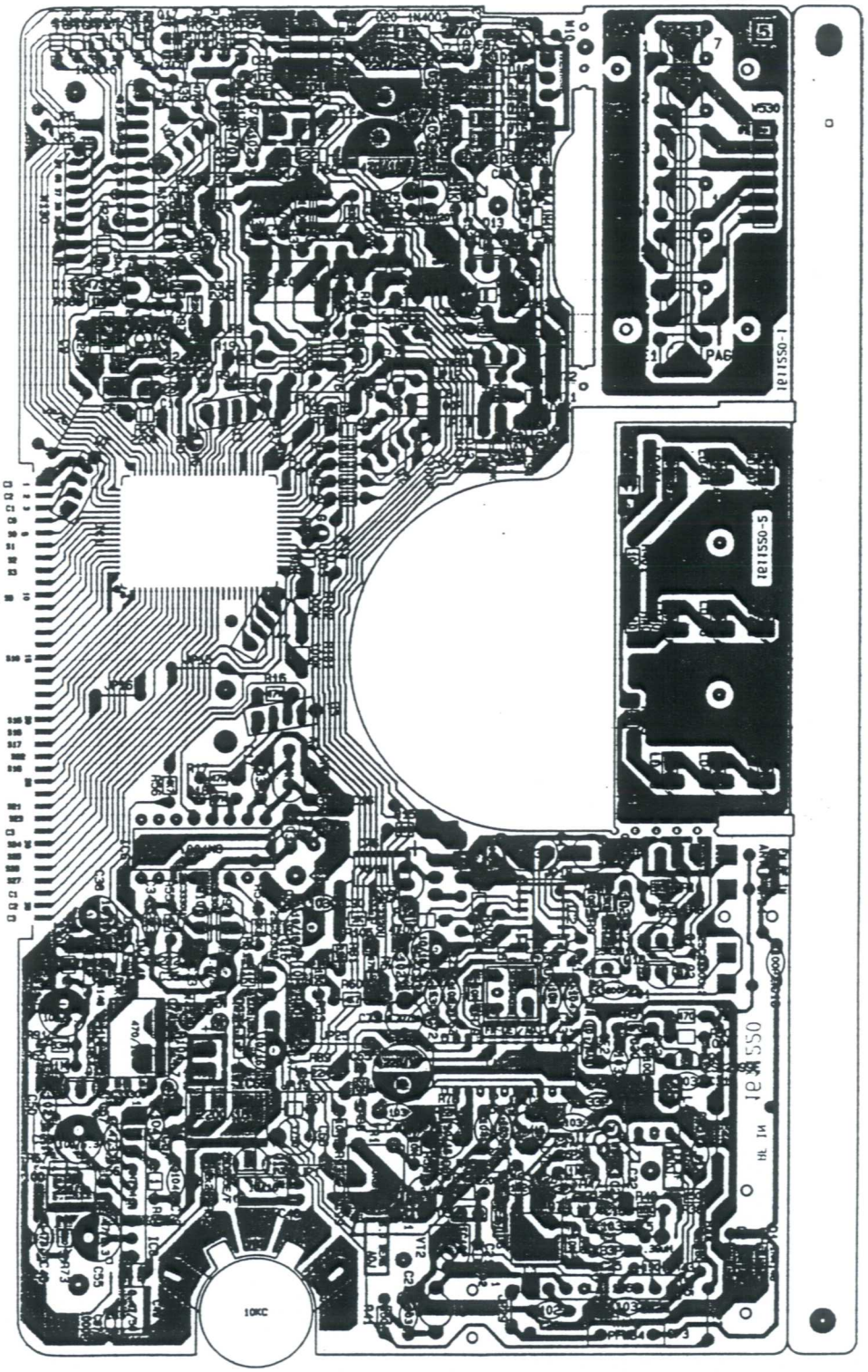
RG-418

WIRING DIAGRAM

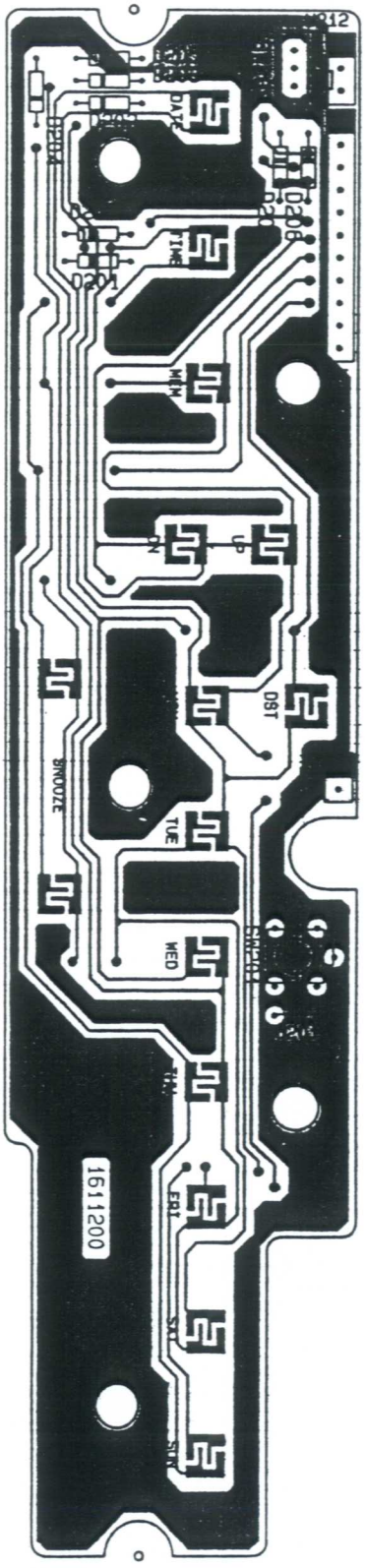
RG-418 WIRING DIAGRAM



MAIN PCB TOP VIEW



CONTROL PCB TOP VIEW

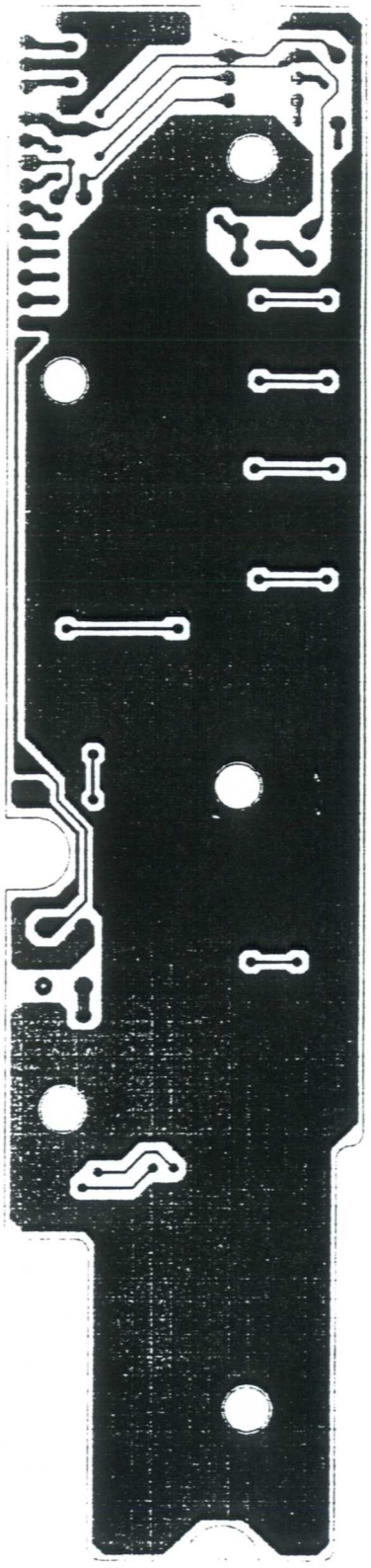


RG-415

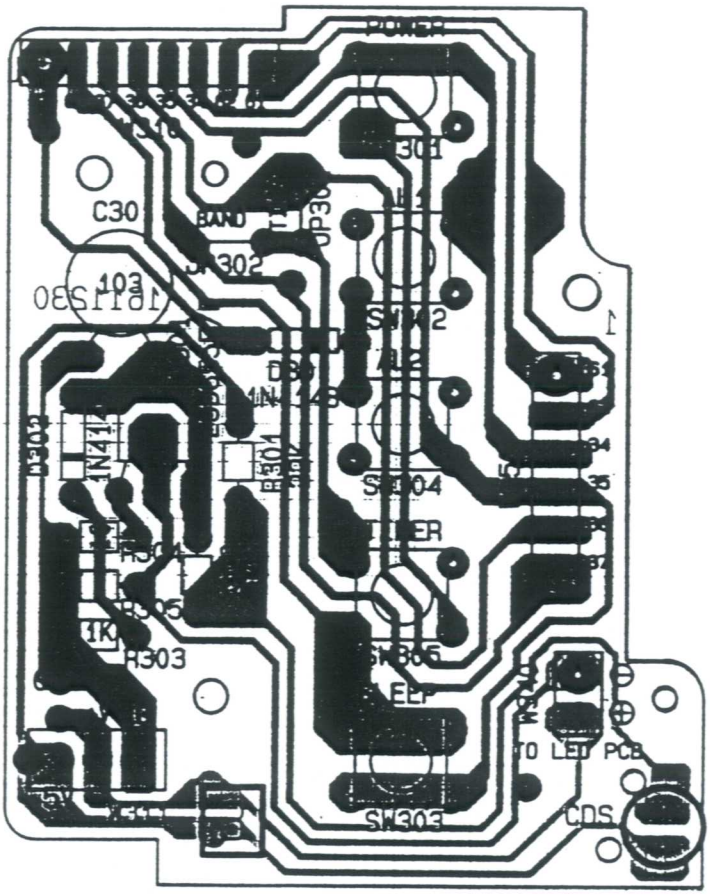
	D201	D202	D203	D204	D205	D206	D207	D208
SIEMENS	D	D	D	D	D	X	X	X
SANGEAN	D	D	D	D	D	*1	*2	X

D: WITH DIODE 1N414B
X: WITHOUT DIODE (OPEN)
*1: OPEN DATE EUROPE
DIODE DATE USA
*2: OPEN 24H
DIODE 12H

CONTROL PCB BOTTOM VIEW



DIMMER PCB TOP VIEW

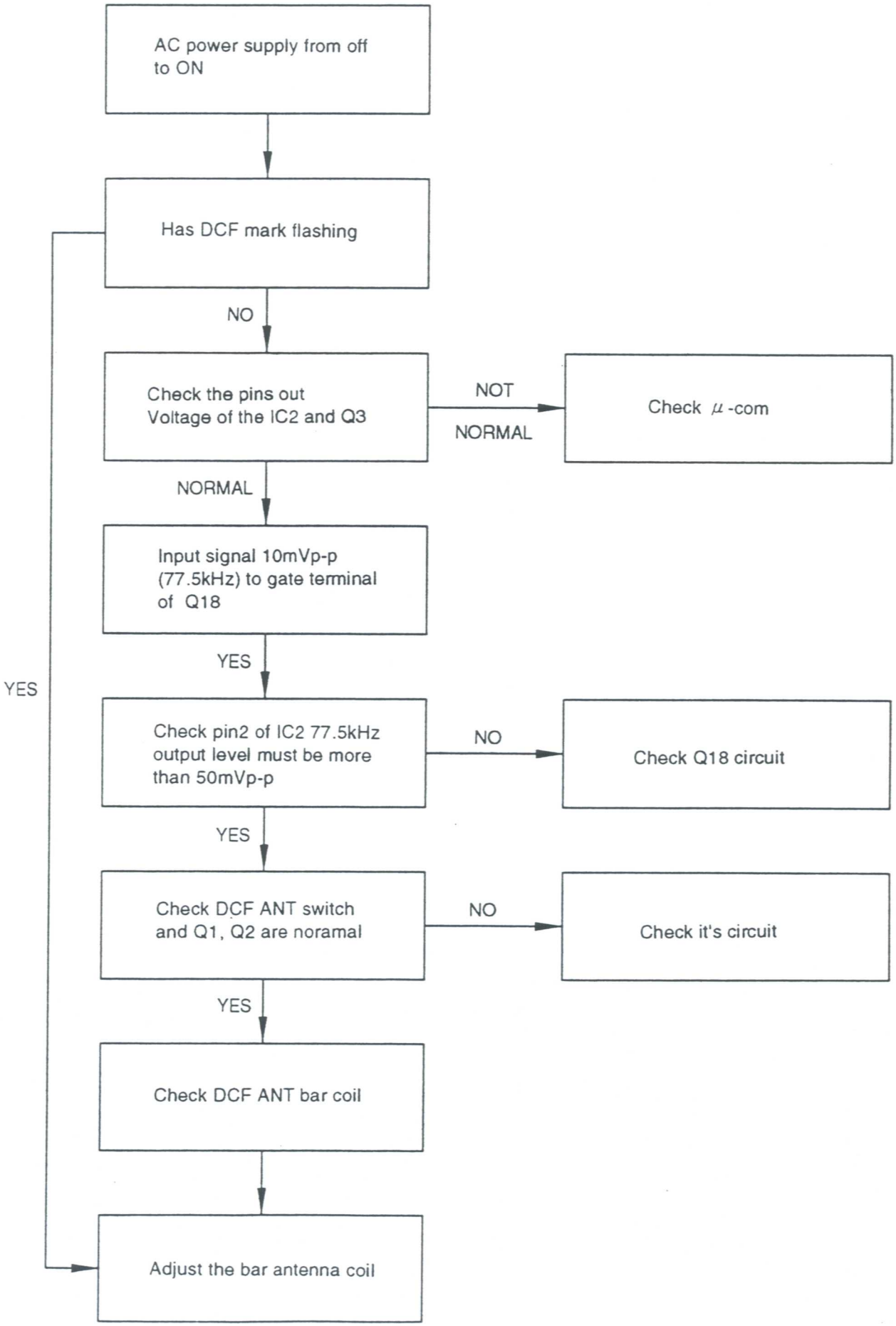


FUNCTION DESCRIPTION OF MAIN PARTS

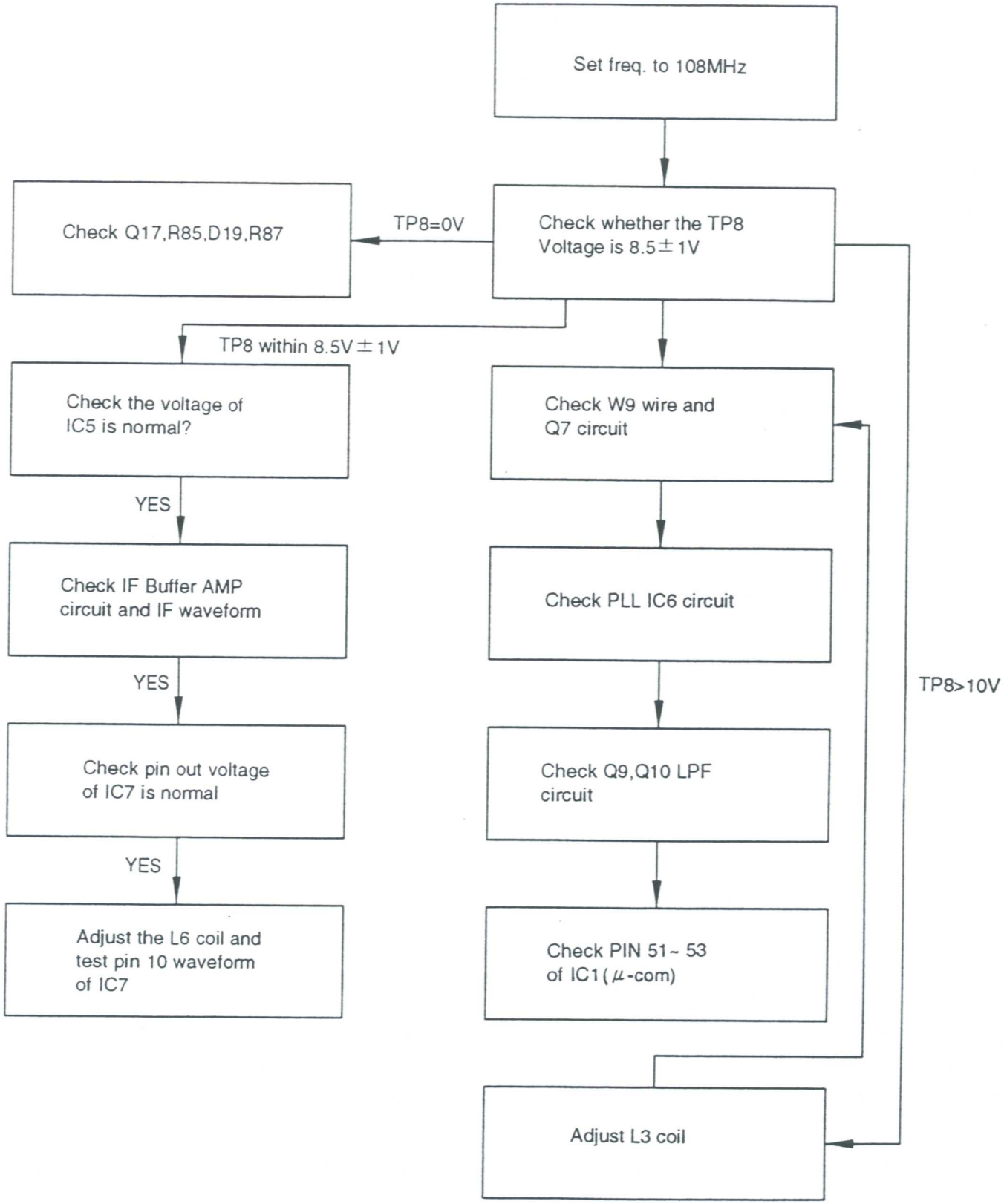
PART NO.		FUNCTION DESCRIPTION
IC1	uPD75308	μ-COM IC
IC2	U4221B-A	DCF RECEIVER AND DECODE IC
IC4	BA10393	SG LEVEL DETECTOR AND ATS FUNCTION
IC5	LA1186N	FM FRONT END IC
IC6	LM7001	PLL IC
IC7	LA1265	FM IF AND DETECT IC
IC8	AN7141	POWER AMP
Q1,2	2SC3330U	DCF ANTENNA SWITCH TRANSISTOR
Q3	2SC3330U	DCF DATA BUFFER AMP
Q4	2SC3330U	SG LEVEL DETECTOR
Q5	2SA1317U	VOLTAGE DETECTOR FOR RESET FUNCTION
Q6	2SA1317U	SWITCH TRANSISTOR FOR BUZZER
Q7	2SK212E	RF BUFFER AMP BETWEEN PLL AND FM LOCAL OSCILATOR
Q8	2SC2999E	10.7MHz IF AMP.
Q9,10	2SC3330U	LOW PASS FILTER OF PLL CIRCUIT
Q11	2SC3330U	5.2V REGULATOR SUPPLY FOR u-COM
Q12	2SD655E	MUTE TRANSISTOR
Q13	2SC3330U	HWS BUZZER CONTROL
Q14	2SC3330U	POWER ON/OFF CONTROL BUFFER
Q15	2SC3330U	6.2V REGULATOR FOR FM RECEIVER CIRCUIT
Q16	2SA1020Y	POWER SWITCH TRANSISTOR FOR RADIO
Q17	2SA1317Y	POWER SWITCH FOR FREQUENCY TUNING VOLTAGE
Q18	2SK381A	DCF RF 77.5kHz PREAMP
Q301	2SD655E	BACK LIGHT DIMMER CONTROL OF LCD

TROUBLESHOOTING FLOW CHART

1. DCF NO WORK



2. FM BAND IS FAILED RECEIVING


Set freq. to 108MHz
Check whether the TP8 Voltage is 8.5±1V
TP8=0V
Check Q17,R85,D19,R87
TP8 within 8.5V±1V
Check the voltage of IC5 is normal?
YES
Check IF Buffer AMP circuit and IF waveform
YES
Check pin out voltage of IC7 is normal
YES
Adjust the L6 coil and test pin 10 waveform of IC7
Check W9 wire and Q7 circuit
Check PLL IC6 circuit
Check Q9,Q10 LPF circuit
Check PIN 51~53 of IC1(μ-com)
Adjust L3 coil
TP8>10V

3. μ-COM DON'T WORKING

Feature:

1. LCD display is disappearance
2. Colon isn't flash of clock
3. Keycontrol is failed